

## CLAIMS

What is claimed is:

1 <sup>Sub</sup> 1. A compressed data structure, comprising:  
2 <sup>B17</sup> a plurality of code strings; and  
3 a plurality of look-up strings each containing an index identifying a  
4 particular code string to be retrieved and an instruction identifying an operation  
5 to be performed on the retrieved code string.

1 2. The data structure of Claim 1, wherein at least some of the code  
2 strings are positioned in a library and the index of at least one look-up string  
3 identifies a position in the library from which a particular code string is to be  
4 retrieved.

1 3. The data structure of Claim 2, wherein the library comprises a  
2 segmented library, each segment of the library containing at least one code  
3 string.

1 4. The data structure of Claim 1, wherein at least some of the code  
2 strings are positioned in a history cache and the index of at least one look-up  
3 string identifies a position in the history cache from which a particular code  
4 string is to be retrieved.

1 5. The data structure of Claim 1, wherein the instruction in a look-up  
2 string comprises an instruction to retrieve the code string identified by the index  
3 in the look-up string and to write that code string to an output memory.

1 6. The data structure of Claim 1, wherein the instruction in a look-up  
2 string comprises an instruction to retrieve the code string identified by the index  
3 in the look-up string, alter that code string, and write the altered code string to  
4 an output memory.

1           7.     A data processing system, comprising:  
2           a plurality of code strings;  
3           a plurality of look-up strings each containing an index identifying a  
4     particular code string and an instruction identifying an operation to be performed  
5     on the identified code string; and  
6           a decompression engine operable, for at least one look-up string, to  
7     retrieve a code string identified by the index in the look-up string and to perform  
8     an operation on or using the retrieved code string according to the instruction in  
9     the look-up string.

1           8.     The system of Claim 7, wherein at least some of the code strings  
2     are positioned in a library and the index of at least one look-up string identifies a  
3     position in the library from which a particular code string is to be retrieved.

1           9.     The system of Claim 8, wherein the library comprises a segmented  
2     library, each segment of the library containing at least one code string and the  
3     instruction in a look-up references the library segment containing the code string  
4     identified by the instruction in the look-up string.

1           10.    The system of Claim 8, further comprising an output memory and  
2     wherein the decompression engine is operable to at least perform the functions  
3     of:  
4           writing the retrieved code string to the output memory; and  
5           altering the retrieved code string according to the instruction in the look-  
6     up string and writing the altered code string to the output memory.

1           11.    The system of Claim 9, further comprising a history cache and  
2     wherein the decompression engine is further operable to:  
3           write to a position in the history cache a code string recently written to  
4     the output memory; and  
5           to retrieve a code string from a position in the history cache identified by  
6     the index in a look-up string, the instruction to retrieve from the history cache  
7     being provided by the instruction in the look-up string.

1           12. The system of Claim 11, wherein the decompression engine is  
2 further operable to repeatedly write the code string retrieved from the history  
3 cache a selected number of times, the selected number being identified by the  
4 look-up string.

1           13. The system of Claim 11, wherein the decompression engine is  
2 further operable to alter the code string retrieved from the history cache and  
3 write the altered code string to the output memory, the code string being altered  
4 according to the instruction of the look-up string.

1           14. The system of Claim 7, wherein the code string each comprise  
2 thirty-two bits.

1           15. The system of Claim 14, wherein at least some of the look-up  
2 string includes no more than eight bits.

1           16. A computing system, comprising:  
2 a first memory location;  
3 a plurality of code strings stored in the first memory location;  
4 a plurality of look-up strings stored in the first memory location, each  
5 look-up string containing an index identifying a particular code string to be  
6 retrieved and an instruction identifying an operation to be performed on the  
7 retrieved code string;  
8 a second memory location;  
9 a decompression program operating from the second memory location,  
10 the decompression program comprising machine readable instructions that when  
11 executed causes a processor, for at least one look-up string, to retrieve the code  
12 string contained in the indexed position identified by the index of the look-up  
13 string and to perform an operation on or using the retrieved code string  
14 according to the instruction of the look-up string; and  
15 a processor in operative communication with the first and second memory  
16 locations, the processor operative to execute the decompression program.

1           17. The system of Claim 16, wherein at least some of the code strings  
2 are positioned in a library and the index of at least one look-up string identifies a  
3 position in the library from which a particular code string is to be retrieved.

1           18. The system of Claim 17, further comprising a processor cache  
2 directly accessible by the processor and wherein the processor is further  
3 operable to load into and access from the processor cache at least portions of  
4 the library and decompression program.

1           19. The system of Claim 17, wherein the library comprises a  
2 segmented library, each segment of the library containing at least one code  
3 string and the instruction in a look-up string references the library segment  
4 containing the code string identified by the index in the look-up string.

1           20. The system of Claim 17, further comprising an output memory  
2 location and wherein the decompression program contains further machine  
3 readable instructions for:

4           writing a retrieved code string to the output memory; and  
5           altering a retrieved code string according to the instruction in the look-up  
6 string and writing the altered code string to the output memory.

1           21. The system of Claim 18, further comprising a history cache  
2 accessible by the processor, and wherein the decompression program comprises  
3 further machine readable instructions for:

4           writing to a position in the history cache a code string recently written to  
5 the output memory; and

6           retrieving a code string from a position in the history cache identified by  
7 the index in the look-up string, the instruction to retrieve from the history cache  
8 being provided by the instruction in the look-up string.

1           22. The system of Claim 21, wherein the decompression program  
2 comprises further machine readable instructions to repeatedly write the code

3 string retrieved from the history cache a selected number of times, the selected  
4 number being identified by the look-up string.

1 23. The system of Claim 21, wherein the decompression program  
2 comprises further machine readable instructions for altering the code string  
3 retrieved from the history cache according to the instruction in the look-up string  
4 and writing the altered code string to the output memory.

1 24. The system of Claim 20, wherein the output memory location and  
2 the second memory location are the same.

1 25. The system of Claim 24, wherein the output and second memory  
2 locations comprise volatile memory.

1 26. The system of Claim 16, wherein the first memory location  
2 comprises non-volatile memory, and the second memory location comprises  
3 volatile memory.

1 27. A method for decompressing a data structure having a plurality of  
2 look-up strings and a plurality of code strings, the method comprising:  
3 reading a look-up string;  
4 retrieving a code string identified by the look-up string; and  
5 performing on the retrieved code string an operation identified by the  
6 look-up string.

1 28. The method of Claim 27 wherein at least some of the code strings  
2 are positioned in a library and the act of retrieving comprises retrieving a code  
3 string from a position in the library identified by the look-up string.

1 29. The method of Claim 27, wherein the act of performing comprises  
2 writing the retrieved code string to an output memory.

1           30.    The method of Claim 27, wherein the act of performing comprises  
2   altering the retrieved code-string by one bit and writing the altered code string to  
3   an output memory.

1           31.    The method of Claim 27, wherein the act of performing comprises  
2   altering the retrieved code string by two or more bits and writing the altered  
3   code string to an output memory.

1           32.    The method of Claim 27, wherein:  
2           a look-up string includes an identifier and an arithmetic string, the  
3   identifier being used to identify a code string to be retrieved; and  
4           the act of performing comprises altering the retrieved code string by  
5   performing a mathematical operation on the retrieved code string with the  
6   arithmetic string and writing the altered code string to an output memory.

1           33.    The method of Claim 27, wherein:  
2           a look-up string includes an identifier and a replacement, the identifier  
3   being used to identify a code string to be retrieved; and  
4           the act of performing comprises altering the retrieved code string by  
5   replacing a selected number of bits in the retrieved code string with the  
6   replacement and writing the altered code string to an output memory.

1           34.    The method of Claim 27, further comprising:  
2           writing to a position in a history cache one or more code strings recently  
3   written to an output memory;  
4           retrieving a code string from a position in the history cache, the position  
5   identified by a look-up string; and  
6           performing on the code string retrieved from the history cache an  
7   operation identified by the look-up string.

1           35.    The method of Claim 34, wherein the act of performing an  
2   operation on the code string retrieved from the history cache comprises writing  
3   that code string to the output memory.

1           36.    The method of Claim 34, wherein the act of performing an  
2 operation on the code string retrieved from the history cache comprises writing  
3 that code string to the output memory a specified number of times, the number  
4 being specified by the look-up string.

1           37.    The method of Claim 34, wherein the act of performing an  
2 operation on the code string retrieved from the history cache comprises altering  
3 the retrieved code string by one bit and writing the altered code string to an  
4 output memory.

1           38.    The method of Claim 34, wherein the act of performing an  
2 operation on the code string retrieved from the history cache comprises altering  
3 the retrieved code string by two or more bits and writing the altered code string  
4 to an output memory.

1           39.    The method of Claim 34, wherein:  
2           a look-up string includes an identifier and an arithmetic string, the  
3 identifier being used to identify a code string to be retrieved; and  
4           the act of performing an operation on the code string retrieved from the  
5 history cache comprises altering the retrieved code string by performing a  
6 mathematical operation on the retrieved code string with the arithmetic string  
7 and writing the altered code string to an output memory.

1           40.    The method of Claim 34, wherein:  
2           a look-up string includes an identifier and a replacement, the identifier  
3 being used to identify a code string to be retrieved; and  
4           the act of performing an operation on the code string retrieved from the  
5 history cache comprises altering the retrieved code string by replacing a selected  
6 number of bits in the retrieved code string with the replacement and writing the  
7 altered code string to an output memory.

1           41.    A computer program product for decompressing a data structure,  
2   the data structure containing a plurality of code strings and a plurality of look-up  
3   strings, the product comprising a machine useable medium having machine  
4   readable instructions thereon for:

5           reading the look-up strings;

6           for each look-up string read, retrieving a code string identified by the look-  
7   up string and performing on the retrieved code string an operation identified by  
8   that look-up string.

1           42.    The product of Claim 41, wherein the instructions for performing  
2   comprise instructions for writing the retrieved code string to an output memory.

1           43.    The product of Claim 41, wherein the instructions of performing  
2   comprise instructions for altering the retrieved code string by one bit and writing  
3   the altered code string to an output memory.

1           44.    The product of Claim 41, wherein the instructions for performing  
2   comprise instructions for altering the retrieved code string by two or more bits  
3   and writing the altered code string to an output memory.

1           45.    The product of Claim 41, wherein:  
2           the index of the look-up string comprises an identifier and a arithmetic  
3   string, the identifier being used to identify a codes string to be retrieved; and  
4           the instructions for performing comprises instruction for altering the  
5   retrieved code string by performing a mathematical operation on the retrieved  
6   code string with the arithmetic string and writing the altered code string to an  
7   output memory.

1           46.    The product of Claim 41, wherein:  
2           the index of the look-up string comprises an identifier and a replacement,  
3   the identifier being used to identify a codes string to be retrieved; and



4 the instructions for performing comprise instructions altering the retrieved  
5 code string by replacing a selected number of bits in the retrieved code string  
6 with the replacement and writing the altered code string to an output memory.

1 47. The product of Claim 41, further comprising instructions for:  
2 writing to a history cache one or more code strings recently written to an  
3 output memory;  
4 retrieving a code string from a position in the history cache, the position  
5 identified by the look-up string; and  
6 performing on the code string retrieved from the history cache an  
7 operation identified by the look-up string.

1 48. The product of Claim 47, wherein the instructions for performing  
2 an operation on the code string retrieved from the history cache comprise  
3 instructions for writing that code string to the output memory.

1 49. The product of Claim 47, wherein the instructions for performing  
2 an operation on the code string retrieved from the history cache comprise  
3 instructions for writing that code string to the output memory a specified  
4 number of times, the number being specified by the look-up string.

1 50. The product method of Claim 47, wherein the instructions for  
2 performing an operation on the code string retrieved from the history cache  
3 comprise instructions for altering the retrieved code string by one bit and writing  
4 the altered code string to the output memory.

1 51. The product of Claim 47, wherein the instructions for performing  
2 an operation on the code string retrieved from the history cache comprise  
3 instructions for altering the retrieved code string by two or more bits and writing  
4 the altered code string to the output memory.

